

REMARKS

The Final Office Action mailed on February 28, 2003, has been received and reviewed. Claims 1-67 are currently pending in the above-referenced application. Each of claims 14-16, 27-30, 34-36, 41, and 45-67 has been withdrawn from consideration as being drawn to a nonelected invention. Each of claims 1-13, 17-26, 31-33, 37-40, and 42-44 stands rejected.

Reconsideration of the above-referenced application is respectfully requested.

Rejections Under 35 U.S.C. § 102(e)

Claims 1-13, 17-26, 31-33, 37-40, and 42-44 stand rejected under 35 U.S.C. § 102(e).

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single reference which qualifies as prior art under 35 U.S.C. § 102. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Mueller

Claims 1-13, 17-26, 31-33, 37-40, and 42-44 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent 6,316,786 to Mueller et al. (hereinafter “Mueller”).

Mueller describes an assembly that includes an organic optoelectronic device 11 and a substrate 16 therefor. The optoelectronic device 11 includes spacers 13 and an electrode 12 protruding therefrom. The substrate 16 includes spacers 15 and a common electrode 17 and organic stack 14 protruding therefrom. Spacers 13 and spacers 15 are positioned so as to align with one another when optoelectronic device 11 is positioned over substrate 16. Likewise, electrode 12 is positioned so as to align with organic stack 14, which is located on common electrode 17.

Mueller explains that the combined thickness D of spacers 13 and 15 are less than the combined thicknesses D1 and D2 of the organic stack 14-common electrode 17 assembly and the

electrode 12, respectively. Col. 6, lines 49-55. In addition, from the description provided at col. 7, lines 5-38, of Mueller, it appears that the optoelectronic device 11 and the substrate 16 are secured to one another by bonding the electrode 12 and the organic stack 14 to one another. Thus, the combined thicknesses D of spacers 13 and 15 is less than the distance that optoelectronic device 11 is spaced apart from the substrate 16.

Further, Mueller lacks any express or inherent description that spacers 13 and spacers 15 are secured to one another, with adhesive or otherwise.

Independent claim 1 of the above-referenced application recites a semiconductor device for use in a stacked multi-chip assembly. The semiconductor device of claim 1 includes at least a semiconductor die and a spacer layer on at least a portion of the surface of the semiconductor die. The spacer layer protrudes from the semiconductor die “substantially a predetermined distance that [the] semiconductor die and an adjacent semiconductor die . . . are to be spaced apart from one another . . .”

Mueller does not expressly or inherently describe a semiconductor device that includes a semiconductor die with a spacer layer protruding from a surface thereof “substantially a predetermined distance that [the] semiconductor die and an adjacent semiconductor die . . . are to be spaced apart from one another . . .,” as recited in independent claim 1. Rather, the spacers 13 and 15 described in Mueller have a combined thickness which is less than the distance that the optoelectronic device 11 thereof is to be spaced apart from a substrate 16.

Further, the “die” of Mueller, which is presumed to be the optoelectronic device 11 thereof, is not configured to be assembled with another semiconductor die but, instead, with a substrate 16, such as a glass substrate or any other substrate which is suited to carry an electrode and an organic layer suited for light emission. Col. 6, lines 12-14; col. 7, lines 54-56; col. 8, line 65, to col. 9, line 3.

For these reasons, it is respectfully submitted that Mueller does not anticipate each and every element of independent claim 1, as is required to maintain a rejection under 35 U.S.C. § 102(e). It is, therefore, respectfully submitted that, under 35 U.S.C. § 102(e), independent claim 1 is allowable over Mueller.

Claims 2-13, 17, and 18 are each allowable, among other reasons, as depending either directly or indirectly from claim 1, which is allowable.

Claim 4 is further allowable because Mueller neither expressly nor inherently describes a semiconductor device that includes at least one discrete conductive element that protrudes above a surface of the semiconductor die and that comprises a bond wire, a thermocompression bonded lead, or a tape-automated bond element.

Claim 8 is additionally allowable since Mueller lacks any express or inherent description that the spacers 13 and 15 thereof comprise a pattern.

Claim 9 is additionally allowable since Mueller does not expressly or inherently describe that the spacers 13 and 15 thereof comprise randomly arranged features.

Claim 10 is further allowance since Mueller includes no express or inherent description that the spacers 13 and 15 thereof comprise a material “that will adhere to a surface of [an] adjacent semiconductor die.”

Claim 17 is also allowable because Mueller neither expressly nor inherently describes a semiconductor device that includes adhesive material on an exposed surface of a spacer thereof.

Claim 18 is further allowable since Mueller does not expressly or inherently describe that spacers 13 and 15 are adhered to one another.

Independent claim 19 recites a semiconductor device assembly that includes a first semiconductor device, a nonconfluent spacer layer on a surface of the first semiconductor device, and a second semiconductor device positioned over the first semiconductor device and adhered to the nonconfluent spacer layer.

As Mueller lacks any express or inherent description that either of spacers 13 and 15 adhere the optoelectronic device 11 thereof to the substrate 16 thereof, it is respectfully submitted that Mueller does not anticipate each and every element of independent claim 19. It is, therefore, respectfully submitted that, under 35 U.S.C. § 102(e), independent claim 19 is allowable over Mueller.

Each of claims 20-26, 31-33, 37-40, and 42-44 is allowable, among other reasons, as depending either directly or indirectly from claim 19, which is allowable.

Claim 31 is additionally allowable since Mueller includes no express or inherent description that the spacers 13 and 15 thereof are mutually adhered to one another.

Claim 33 is further allowable because Mueller does not expressly or inherently describe that the spacers 13 or 15 thereof are arranged in a pattern.

Claim 37 is also allowable since Mueller does not expressly or inherently describe that the assembly of optoelectronic device 11 and substrate 16 may be positioned upon another substrate.

Claim 38, which depends from claim 37, is further allowable because Mueller neither expressly nor inherently describes that a bond pad of either the optoelectronic device 11 or the substrate 16 may communicate with a corresponding contact area of another substrate.

Claim 39 also depends from claim 37 and is further allowable since Mueller lacks any express or inherent description that the assembly of optoelectronic device 11 and substrate 16 may be positioned upon a circuit board, an interposer, another semiconductor device, or leads.

Claim 40 is additionally allowable because Mueller does not expressly or inherently describe that spacers 13 and 15 may be positioned between an active surface of optoelectronic device 11 and a back side of substrate 16. Rather, the optoelectronic device 11 and substrate 16 of Mueller are oriented in a flip-chip, or face-to-face, relationship.

Claim 42 is further allowable because Mueller neither expressly nor inherently describes that the spacers 13 and 15 thereof define a distance between optoelectronic device 11 and substrate 16. Instead, the description of Mueller is limited to spacers 13 and 15 having a combined thickness D which is less than the distance D₁ + D₂ that optoelectronic device 11 and substrate 16 are spaced apart from one another.

Chang

Claims 1-13, 17, and 18 also stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Application Pub. 2002/0070463 A1 of Chang et al. (hereinafter “Chang”).

Chang describes a semiconductor device assembly that includes an integrated circuit element 30 and a substrate 20. The integrated circuit element 30 is configured to be flip-chip bonded to the substrate 20, with composite bumps 32/36 electrically connecting input/output pads 26 of the integrated circuit element to corresponding input/output pads 24 of the substrate 20. Each composite bump 32/36 includes a polymer body 32 which is covered or coated with a conductive metal coating 36. It has been asserted in the outstanding Office Action that each composite bump 32/36 comprises a spacer.

Chang lacks any express or inherent description that any other structures may be positioned between the integrated circuit element 30 and the substrate 20.

It is respectfully submitted that the composite bumps 32/36 of Chang do not comprise a “dielectric spacer layer,” as recited in independent claim 1, as proposed to be amended, because each composite bump 32/36 includes a conductive metal coating 36.

Accordingly, it is respectfully submitted that Chang does not anticipate each and every element of amended independent claim 1 and, therefore, that, under 35 U.S.C. § 102(e), amended independent claim 1 is allowable over Chang.

Claims 2-13, 17, and 18 are each allowable, among other reasons, as depending either directly or indirectly from claim 1, which is allowable.

Claim 3 is further allowable since Chang does not expressly or inherently describe a semiconductor device that includes both a dielectric spacer layer (e.g., composite bumps 32/36) and a discrete conductive element protruding above a surface of the integrated circuit element 30 thereof.

Claim 4 is additionally allowable since Chang lacks any express or inherent description that the integrated circuit element 30 thereof has a bond wire, a thermocompression bonded lead, or a tape-automated bond element protruding from a surface thereof.

Claim 5 is also allowable because Chang neither expressly nor inherently describes that the composite bumps 32/36 thereof protrude above a surface of the integrated circuit element 30 a distance which exceeds a distance that at least one discrete conductive element protrudes therefrom. Rather, all of the composite bumps 32/36 have the same height.

Claim 9 is additionally allowable since Chang includes no express or inherent description that the composite bumps 32/36 thereof may be randomly arranged.

Claim 12 is further allowable because Chang neither expressly nor inherently describes that the polymer bodies 32 thereof may comprise a photoimageable polymer.

Claim 13 is also allowable since Chang does not expressly or inherently describe that either the polymer bodies 32 or the conductive metal coatings 36 thereon may comprise one or more of glass, silicon dioxide, silicon nitride, and silicon oxynitride.

Claim 17 is additionally allowable because Chang neither expressly nor inherently describes that any of the composite bodies 32/36 thereof may include adhesive material thereon.

ELECTION OF SPECIES REQUIREMENT

It is respectfully submitted that independent claims 1 and 19 remain generic to all of the species of invention that were identified in the Election of Species Requirement in the above-referenced application. In view of the allowability of these claims, claims 14-16, 27-30, 34-36, 41, and 45-67, which have been withdrawn from consideration, should also be allowed.

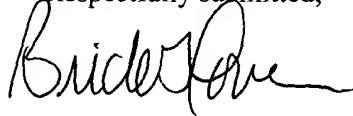
ENTRY OF AMENDMENTS

It is respectfully submitted that the claim amendments that are proposed herein should be entered since they do not introduce new matter into the above-referenced application and would not require an additional search. If, for some reason, it is determined that the proposed amendments do not place the above-referenced application in condition for allowance, entry is respectfully requested upon filing of a Notice of Appeal in the above-referenced application.

CONCLUSION

It is respectfully submitted that each of claims 1-67 is allowable. An early notice of the allowability of each of these claims is respectfully solicited, as is an indication that the above-referenced application has been passed for issuance. If any issues preventing the allowance of the above-referenced application remain which might be resolved by way of a telephone conference, the Office is kindly invited to contact the undersigned attorney.

Respectfully submitted,



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Date: April 21, 2003

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